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ABSTRACT

This document contains four papers from a symposium on work analysis and expertise. "A Taxonomy of Employee Development: Toward an Organizational Culture of Expertise" (Ronald L. Jacobs) includes five categories of employee competence: novice, specialist, experienced specialist, expert, and master. "An Integrated Needs Assessment-Evaluation Process" (Sharon J. Korth) considers the benefits of integrating needs assessment and evaluation using a performance improvement process. In "Needs Assessment in Practice" (Catherine M. Sleezer, Craig A. Maile), multiple case studies show that human resource development professionals initiate needs assessment in varied situations with multiple purposes, achieving varied results. "An Integrative Job Analysis Model for Human Resources" (David E. Arnold, Timothy McClernon) explores one company's effort to develop a model capable of serving several human resource processes. (KC)

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**ACADEMY OF HUMAN RESOURCE DEVELOPMENT**

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## March 6-9, 1997
## Atlanta, GA

11 Work Analysis and Expertise

**Chair: R. Wayne Pace, Brigham Young University**

A Taxonomy of Employee Development: Toward an Organizational Culture of Expertise
*Ronald L. Jacobs, Ohio State University*

An Integrated Needs Assessment-Evaluation Process
*Sharon J. Korth, Xavier University*

Needs Assessment in Practice
*Catherine M. Sleezer, Oklahoma State University*
*Craig A. Maile, Oklahoma Dept. of Vocational and Technical Education*

An Integrative Job Analysis Model for Human Resources
*David E. Arnold, University of Minnesota*
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# A Taxonomy of Employee Development: Toward an Organizational Culture of Expertise

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*This paper presents a taxonomy of employee development comprised of five categories of employee competence. The categories represent increasingly complex levels of knowledge and experience related to a particular task or set of tasks. The proposed taxonomy is based on three issues that have emerged in regards to the relationship between employee competence and job performance. HRD issues and implications are discussed.*

This paper presents a taxonomy of employee development comprised of five categories of employee competence. The categories represent increasingly complex levels of knowledge and experience related to a particular work task or set of related tasks. Such a taxonomy can be useful to organizations seeking to maximize the contributions of their employees, for the benefit of both organizations and individuals. Specifically, the paper describes the taxonomy and the five categories of employee competence that comprise the taxonomy. Second, the paper discusses three emerging points about the relationship between employee competence and job performance, which serve as the rationale for the proposed taxonomy of employee development. Finally, the paper discusses the HRD issues and implications of the taxonomy. The underlying goal of this paper is to contribute to our understanding of how employee competence relates to organizational performance, toward promoting an organizational culture of employee expertise.

## Taxonomy of Employee Development

Employee development is defined here as the planned process of enhancing an employee's abilities through a variety of work-related learning opportunities. Thus, employee development represents more than formal training programs alone. In addition to training programs, it may include other programs and initiatives such as job rotations, mentoring, outside educational experiences, and so on (Jones & Jacobs, 1997). The focus of the proposed taxonomy of employee development is not on the process itself. Instead, the taxonomy is about the outcomes that result when individuals engage in the process. These outcomes are represented on the taxonomy as five levels of employee competence: 1) novice, 2) specialist, 3) experienced specialist, 4) expert, and 5) master.

Similar to Gilbert (1978), competence is generally regarded as the potential of individuals to use specific sets of knowledge and skills. The term employee competence is used here to denote the relative abilities of individuals with respect to a particular work task or set of related tasks. It is presumed that employees may achieve different levels of competence for the various tasks on their jobs. Each level of the taxonomy represents greater knowledge and experiences than the level preceding it. Thus, it is assumed that employee development programs can be designed to help employees achieve specific levels of competence.

The levels of competence presented here are drawn from earlier works on the topic of human expertise as presented by Hoffman, Shadbolt, Burton, & Klein (1995). Table 1 summarizes the five levels of competence in the proposed taxonomy of employee development.

***Novice***. Novice employees are unable to meet job expectations because they have little or no knowledge and skills and experience with the task in question. Novices are relatively easy to identify in organizations, as they typically represent individuals who are newly hired, recently transferred, or have been newly-promoted.

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***Specialist***. As a general category, specialist employees are perhaps the most interesting, and sometimes, the most misleading level of development. On the one hand, by design, specialist employees make important contributions to their organizations because they can reliably perform routine tasks; that is, they can perform known tasks such as complex laboratory tests. On the other hand, because they have limited information, they lack the ability to be effective in doing anything much beyond the routine tasks.

***Experienced Specialist***. Experienced specialists are unique in that they usually have had many opportunities to perform the same tasks and can do them with much skill. Experienced specialists are often mistaken for having greater abilities than they actually do, simply because of the ease in which they perform tasks. Even so, experienced specialists lack the combination of knowledge and experience to be truly considered experts in their work.

***Expert***. Many experienced specialists become experts, but not all of them necessarily achieve this level of development. Experts have characteristics distinct from specialists, and confusing the categories often has detrimental affects on organizational performance. By definition, being an expert means that the individual possesses expertise in certain aspects of their jobs. Thus, the notion of expertise refers only to those individuals who are considered experts. The psychology literature has a long history of describing the unquiet nature of experts, consistently showing that experts organize and use information in ways that differ substantially from others around them (Chi, Glaser, & Farr, 1988).

Among other behaviors, experts have unique ways of viewing and solving problems. Experts have a propensity to engage in progressive problem solving -- a technique by which they create problem situations in which none existed beforehand from which hypotheses can be generated and confirmed. In this way, experts intentionally impose theory onto problems, with the intent of enriching their own understanding of the situation.

***Master***. The master employee represents an elite group of experts. Their actions and judgments often set the standards for all others beneath them. Master employees are the individuals who are regarded as "the" expert among experts. They are the role models from which others can learn and judge the adequacy of their own knowledge and skills. Others turn to the master employee when an interpretation of information is required. Master employees are often asked to be the trainers of others, but their high level of knowledge and experience may be unnecessary for many training situations.

**Figure 1. Taxonomy of Employee Development**

| *Category* | *Description* |
|---|---|
| Novice | Literally, one who is new to a particular work situation. There is often some, but minimal exposure to the task beforehand. As a result, the individual lacks the knowledge and skills necessary to meet the requirements set to adequately perform the task. |
| Specialist | One who can reliably perform specific tasks unsupervised. But the range of tasks is limited to the most routine ones. Often it is necessary to coach individuals at this level to help them use the most appropriate behaviors. |
| Experienced Specialist | One who can perform specific tasks and who has performed those tasks many times. As a result, the individual can perform the tasks with ease and skill. It is possible to remain at this level for an extended period of time. |

| | |
|---|---|
| Expert | One who has the knowledge and experience to meet and often exceed the requirements of the task. The individual is distinguished and highly-regarded by peers because of his or her consummate skills, or expertise. The individual can use this ability to deal with routine and non-routine cases, with an economy of effort. |
| Master | One who is regarded as "the" expert among experts, or the "real" expert among all others. He or she is among the elite group whose judgments are looked upon to set the standard and ideals for others. |

**Employee Competence and Job Performance**

Underlying the need for the proposed taxonomy is the realization that the relationship between employee competence and job performance is more complex than what it might first appear. The relationship between these two variables has been a particular concern among human resource development (HRD) scholars and practitioners. As stated, employee competence is the potential to use specific sets of knowledge and skills. Job performance is the measurable outward manifestation of individuals having used that knowledge and skills. Recent research has clearly shown that employee competence can have positive affect on measures of job and organizational performance (Torraco & Swanson, 1995). For instance, Jacobs (1994) has demonstrated how employees receiving structured OJT made fewer defects and had increased training efficiency than employees receiving unstructured OJT. Recently, however, there has been a move toward refining the basic understanding between competence and performance. Three related points of discussion have emerged in this regard:

1. There is not a continuous linear relationship between employee competence and job performance;
2. Employees may not need to develop high levels of competence in all tasks to meet and exceed job requirements; and,
3. It is incumbent upon organizations to more precisely match competence levels and job performance requirements.

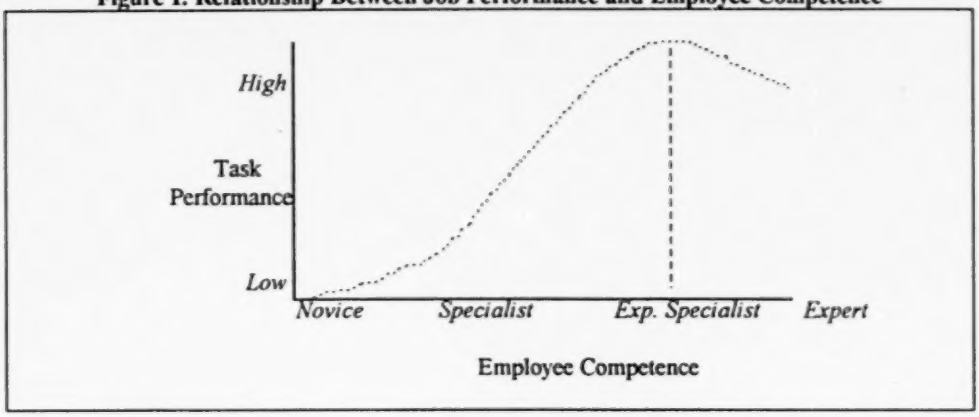
The first discussion point is the growing awareness that there is not always a continuous linear relationship between employee competence and job performance. That is, more competence placed on top of what is required does not necessarily have an additive effect on performance. In fact, there is more likely a point of diminishing returns in which more than the required competence may hinder or reduce job performance, not enable it. As shown in Figure 1, the relationship for any given task is perhaps more nonlinear. Measures of job performance would likely rise, but begin to level off when it approaches and then passes whatever level of employee competence is required to achieve the desired task performance. In this instance, performance in fact begins to decrease as employees move beyond the level of an experienced specialist. Hence, this discussion point suggests that the relationship between job performance and employee competence would be more a curve than a straight line.

This first discussion point further illustrates the often delicate relationship between employee competence and job performance. It is a common frustration for both organizations and customers when employees have less than the required level of competence. And, there may be frustration of a different sort when employees have too much competence to perform the task. For instance, consider when a computer consultant attempts to troubleshoot a particular computer problem, a task which he or she is not competent. One consequence of this situation is that the

problem will unlikely be solved. Another consequence is that the customer often feels compelled to become part of the problem-solving process, perhaps just to escape from the uncomfortable situation.

Problems can also arise when employees have a higher than required level of competence. In this case, the same computer problem may get solved, but the solution may be larger than what is actually needed by the customer and, perhaps, the solution is more costly than what otherwise might be the case. I am reminded of the advice given by a well-regarded computer consultant who wanted to remove all files from my hard disk to solve my frequently occurring lock-up problem. In fact, all that was needed was the removal of stray files left over from previously removed programs. Paradoxically, knowing too much may also be a hindrance in meeting the desired performance requirements.

**Figure 1. Relationship Between Job Performance and Employee Competence**




The second discussion point is that employees may not need to develop high levels of competence in the tasks they are expected to perform, and still be able to *meet* or *exceed* job expectations. Indeed, employee competence should be viewed within its proper performance context. For instance, the level of competence required of employees in a quick oil-change organization presumably differs from employees in an auto-repair organization. In a relative sense, employees in the quick oil-change organization should perform at the specialist level in terms of tasks related to the lubrication of automobiles. There is a need to perform the prescribed tasks, quickly, accurately, and safely. In contrast, employees in the auto-repair organization may require more in-depth knowledge and experiences, perhaps, say, at the experienced specialist or at least one individual at the expert level of competence. With this greater knowledge and experience, they would be able to diagnose why, for instance, the oil light comes on when the automobile is driven. Clearly, both organizations require employees who are competent. But, what determines whether the level of competence is appropriate is based on the requirements imposed by the organization.

The final discussion point is that it increasingly seems incumbent upon organizations to more precisely match the performance requirements of tasks and levels of employee competence. To some extent this match is done whenever a work analysis is performed (Swanson, 1994). But, this analysis generally seeks to identify the single best level of competence only. However, more and more, it has become necessary to understand how the same tasks might be represented along differing levels of competence. This additional information has become critical as organizations have placed greater emphasis on improving work processes (Rummler & Brache, 1995). Work processes are the series of activities, usually crossing jobs and functional areas, that culminate in completed products or processes. As a consequence, employees should know more about the various tasks on their processes (Jones & Jacobs, 1997). Cross training enables employees to

perform more tasks on the processes, but whether employees should, or even can, possess equal levels of competence on those tasks might be questioned.

For instance, a nutritional product manufacturer has identified a contract development process, which results in a completed sales proposal to be presented to a large institutional customer. Employees in the Pricing Department require high levels of competence in the tasks of calculating unit costs and profit margins. At the same time, employees in the Contract Sales department require the same high levels of competence in interpreting nutritional market data, presenting contract presentations to customers, and so on. Clearly, in order for the work process to function smoothly, all employees should receive some training on the other's tasks. Contract Sales employees should understand the basic principles of calculating unit costs and profit margins, even to the extent of doing some calculations themselves when a faster cycle-time is required by some customers. In turn, Pricing employees should understand what is involved in making a contract presentation to an institutional customer, and even participate in one presentation if possible to immediately address pricing questions.

## HRD Issues and Implications

The proposed taxonomy of employee development seeks to help HRD professionals and managers better understand the different levels of employee competence and to match those levels with the requirements of specific work tasks. In doing so, the taxonomy may be subject to several issues of concern. First, there may be the initial reaction that the taxonomy would have the undesired affect of limiting employee development goals, instead of promoting them. That is, the taxonomy would impose upper limits on what employees would be learning and doing on their jobs, based on static organizational requirements. Clearly, this would be self-defeating for both individuals and organizations. Employees should be given planned development opportunities to achieve the highest levels of performance possible. Achieving average levels of performance is not the desired intent of the taxonomy. Instead, the intent is to achieve high performance, but within the context of meeting established job requirements, though these requirements should not be considered immutable.

Simply put, organization managers want competent employees to do the best of what is expected of them. In the long-term view, however, it would be incorrect to limit individuals who are performing at, say, the specialist level. If appropriate, planned employee development programs should be made available to help those individuals move beyond their present levels of competence. Having employee development programs serve this function is a central notion of operationalizing an organizational culture of employee expertise.

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# An Integrated Needs Assessment-Evaluation Process

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*Needs assessment and evaluation processes are receiving increasing attention as HRD practitioners are striving to help organizations meet their goals. Although there is often a passing mention of the other process, most of the literature and research on needs assessment and evaluation is separate. The purpose of this paper is to propose an integrated process and discuss the potential benefits of considering these two processes in tandem.*

Needs assessment and evaluation are strategic HRD processes receiving renewed attention in both research and practice (Holton, 1995, 1996; Jedrziewski, 1996; Phillips, 1994, 1995; Swanson, 1994). In performance improvement as well as instructional design models, these processes are considered critical because they are where the HRD professional collaborates with leaders in the organization and determines how HRD and other interventions can help support the organization's objectives and strategies (Brinkerhoff & Gill, 1994; Robinson & Robinson, 1995; Stolovitch & Keeps, 1992; Zemke & Kramlinger, 1982).

## Theoretical Framework and Problem Statement

In most literature, needs assessment and evaluation are considered to be discrete processes, or distinct sub-processes of a larger system (Kirkpatrick, 1994; Phillips, 1991; Rossett, 1990). Although there is sometimes mention that these processes are interrelated, the nature of the relationship is not clearly described (Jedrziewski, 1996; Robinson & Robinson, 1989; Rothwell, 1996). For example, as part of the evaluation process, measurements may be taken before the intervention. Is that part of the evaluation process or the needs assessment process?

Brinkerhoff (1988) as part of his six-stage evaluation cycle, includes both assessment and evaluation and addresses the interrelationship between the two. Holton (1995) also discusses the connection between needs assessment and evaluation through an illustration that compares the organizational, job or task, and individual types of assessment with four corresponding types of evaluation. This is a very helpful framework for understanding that data and measurements from the needs assessment become the baseline for comparison in the evaluation. As Brinkerhoff (1988) says, "Stage one [needs assessment] is not complete until it has developed a definitive answer to that question "How will we tell if the HRD has been worthwhile?" (p. 51).

Kaufman and Keller (1994) support "comparing results with intention" as a definition of evaluation. The implication in this definition is that intended results are identified in advance and those intentions are compared with the actual results. Wade (1994) proposes the use of a chart that compares pre- and post- information and uses the terms "pre-training baseline measure," "post-training target," and "post-training actual measure" in relation to analyzing the results and impact of training. Swanson and McClernon (1996), in their Performance-Learning-Satisfaction (PLS) Evaluation System, include several potential data collection points on a time line, including before, during, and after the program or intervention. In all three of these models, there is a "pre" or "baseline" or "intention" that is identified and compared to a later result. Are these measures or expectations determined as part of the needs assessment process, or as an additional step as part of the evaluation plan?

Recently, the limitations of Kirkpatrick's (1976) training evaluation model have been discussed (Alliger & Janak, 1989) and new models proposed (Holton, 1995, 1996; Jedrziewski, 1996;

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Swanson, 1996). These models hold great promise for an evaluation process that is based in research and identifies valid interrelationships between domains. While the focus of these efforts has been on creating evaluation models and processes, the connection with the performance analysis or needs assessment process is not explicit. The purpose of this paper is to build upon the evaluation work and create a framework that integrates the needs assessment and evaluation processes.

## Research Question and Methodology

The primary question to be answered by this research is: How can the needs assessment and evaluation processes be integrated? The methodology used to answer this questions is an adaptation of Dubin's (1976) guidelines for theory building in applied areas. He focuses on the construction of theories and models that have immediate and direct application, and delineates between the role of the theorist-researcher and the practitioner. Dubin (1976) states that,

> The underlying motive for this modeling is either (1) that the real world is so complex it needs to be conceptually simplified in order to understand it, or (2) that observation by itself does not reveal ordered relationships among empirically detected entities. A theory tries to make sense out of the observable world by ordering the relationships among elements that constitute the theorist's focus of attention in the real world. (p. 26)

This integrated model was developed by analyzing empirical research as well as practitioner literature about needs assessment and evaluation processes. This research resulted in the identification of numerous elements and potential relationships between the elements. The proposed integrated process is just an initial step in the development of a valid model. The elements, the relationships, as well as the utility of an integrated process need to be tested. Further discussion, debate, and research is necessary to expand and improve this model.

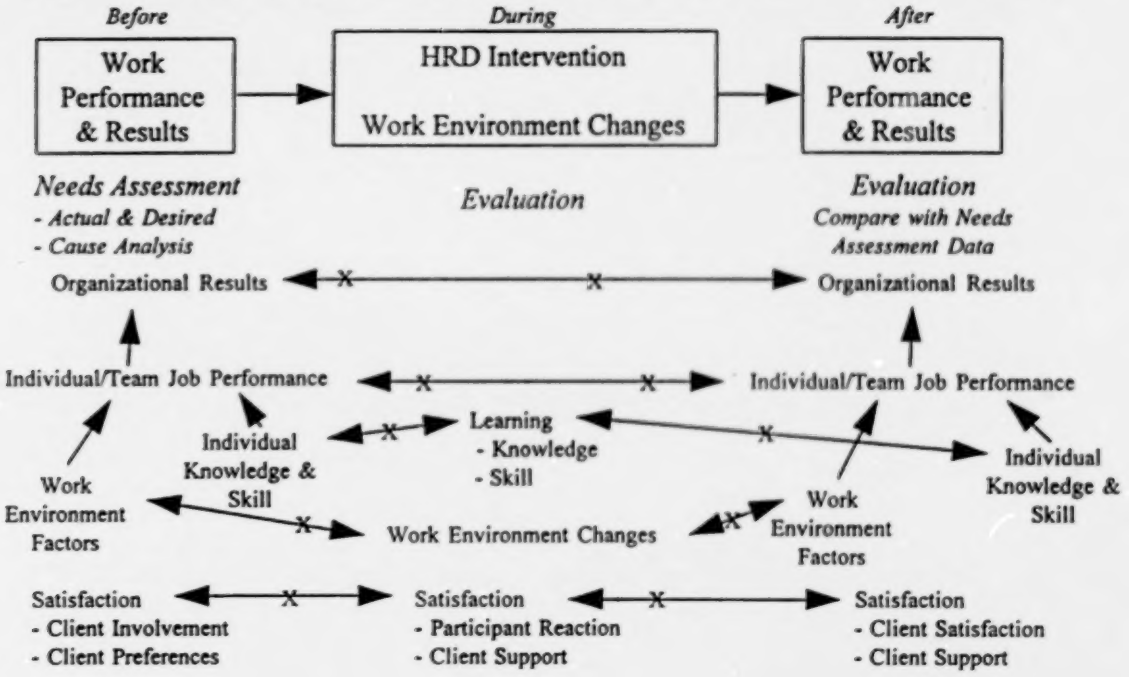
## Proposed Process

The proposed process, which integrates needs assessment and evaluation, follows a performance improvement approach. This means that the needs assessment takes either a "problem" or "opportunity" orientation to a workplace issue. The integrated process consists of three phases -- before, during, and after the HRD intervention and/or work environment changes. Indicators or measures are determined and compared across these three phases in the areas of organizational results, individual/team performance, individual knowledge and skill, work environment factors, and satisfaction. (See Figure 1). The first phase (before) is the familiar needs assessment process, while the second (during) and third (after) phases are the evaluation measures.

***"Before" Phase*** The desired and actual organizational results, in business terms and/or dollar amounts are determined along with the desired and actual job performance that relates to those results. This job performance can be for one individual or for a team. The cause of the gap between the desired and actual performance and results is explored, looking for potential interventions that will address the root cause. If the cause of the problem or the obstacle for the opportunity is a lack of skill or knowledge, then training or another HRD learning-focused intervention will be part of the solution. Other potential interventions that address non-learning related problems include those that address the myriad of work environment factors, such as changing the compensation system, the performance management system, or the design of the job. Often, there are multiple and interrelated causes of the problems, therefore, a systems approach is taken to the solution as well.

During this needs assessment phase, it is helpful for the HRD professional to work collaboratively with the clients in the organizational system, those who have a stake in the desired performance improvement and who have the authority make changes that may be indicated by the analysis. One measure of customer satisfaction during this phase is the level of involvement of the client. Additional information that can be collected at this phase is related to the participants'

## Figure 1. An Integrated Needs Assessment-Evaluation Process




X = internal or external factors/events

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preferences regarding the time, place, and format of the upcoming HRD interventions. This can be useful in the design and implementation phase. After the needs assessment phase, the HRD program as well as the other interventions related to the workplace changes are designed and implemented.

***"During" Phase*** The second phase of the process (during), moves into the evaluation process. Measures of participant learning can be taken throughout and at the end of the HRD intervention. This measure relates directly to the individual knowledge and skill gaps that were identified in the assessment phase. The work environment changes are put in place as well, which might involve a new compensation plan or performance support system. Tracking and understanding these changes is important because they will affect the work environment in which the participants will be operating. The customer satisfaction indicators during this phase include the participants' reaction to the HRD intervention as well as measures of the client's support of the intervention system. Furthermore, while HRD interventions and work environment changes are taking place, other events, expected or unexpected, will be occurring which will have an impact on the individuals involved in the process. In today's dynamic organizations, the HRD practitioner must be aware that many internal and external factors, other than those related to the prescribed HRD intervention or work environment changes, can impact the organizational results, the job performance, the individual's knowledge and skill, the work environment factors, or client satisfaction. For example, if layoffs were announced during the time span of this needs assessment-evaluation process, many of these elements, such as client support of the HRD intervention, and individual job performance, would likely be affected.

***"After" Phase*** Finally, the new systems are in place and the participants are back on the job after increasing their knowledge and skill in a particular area. The "after" evaluation involves measures that relate back to the data collected in the two previous phases. After an appropriate length of time, the organizational results and job performance are measured and compared to the actual and desired measures from the "before" phase. Similarly, individual skill and knowledge can be compared to the "before" as well as the "during" measures. The work environment factors are monitored to see if the changes are positively supporting the desired job performance. Customer satisfaction issues in this phase include client satisfaction with the process and the results, as well as their ongoing support. This support is often most important in the work environment factors, which might include additional resources. As mentioned earlier, it is also important to identify potential additional factors which may have influenced the results on any of the elements.

## Hypothetical Case

In order to illustrate this process, a simplified hypothetical case will be described. In the "Before" phase, the following information is obtained. An organization wants to increase the customer satisfaction ratings from the current 3.5 to 4.2 on a 5.0 scale (actual and desired organizational result) in order to continue to compete in the competitive market. The cause analysis indicated that one reason for the low rating is that the customer service reps are leaving callers on hold too long and are then transferring them to the wrong people; the desired job performance is that callers be on hold no longer than 5 seconds and that they be referred to the correct department on the first transfer (actual and desired job performance). It was determined that the reps need to become more familiar and adept with the new features on the phone system and better understand the work of the various departments in order to make the correct recommendation (actual and desired knowledge and skill). Work environment factors that inhibit the desired job performance include an open space work area where many people walk by and interrupt the reps while they are on the phone with customers. During the needs assessment process, clients are actively involved and the reps are asked about their preferences regarding the format of the training as well as the redesign of their work space.

In the "During" phase, training is conducted for the reps, job aids are created which they will use back on the job, and their work area is partitioned so that they are not interrupted while on the phone with a customer. Their learning is measured by written knowledge tests as well as skill demonstrations on the phone system, and their satisfaction with the training is determined through reaction evaluations. Client support is measured by attendance levels and supervisor participation in

the training.

In the "After" phase, the organizational results and individual/team job performance are compared with the desired results identified in the "Before" phase. In this hypothetical example, the customer satisfaction ratings rose to 4.3 (organizational results) and the customer service reps are now keeping customers on hold for less than 5 seconds and have a 90% success rate of referring customers to the correct person (job performance). For individuals who are having difficulty, their knowledge and skill (learning) are retested and compared to their scores before and during the HRD intervention. If they have not retained the skill and knowledge, then other interventions are prescribed. If they show that they have the necessary skill and knowledge, then additional work environment factors that are affecting their performance are explored. The original work environment changes (making the work space more private) are analyzed to see if they help achieve the desired results. Reps report that the lack of interruptions is very helpful in their goal to focus on the customer's needs. Satisfaction is determined through indications or measures of client satisfaction and support, such as jointly celebrating success, and additional requests for performance improvement consultation from the clients. One unexpected event that had an effect on the reps' job performance was a recall on a product that resulted in a flood of phone calls. Once the calls started, the job performance targets were not being met, so the reps and their managers had to develop a quick plan to address the issue.

This hypothetical example is overly simplified in order to quickly work through the elements of the process. The intention is to make the model more concrete and to see how it can actually work in practice. One important part of this process is the collaboration between the HRD practitioner and the clients. If the integrated needs assessment-evaluation process is planned together, then the client becomes aware of the many factors that affect performance on the job and the HRD practitioner becomes a true partner in helping the organization be more effective.

## Contribution to HRD

This is a preliminary model, one that has been recently developed to encourage discussion, debate, suggestions, and modifications. By raising the issue, however, those who are researching and practicing HRD or performance technology will be aware of (a) the strategic nature of these processes, (b) the interrelationships between needs assessment and evaluation, and (c) the implications for practice. For example, one implication would be to increase efficiency in the overall process by designing needs assessment strategies and instruments that support follow-up evaluation comparisons.

Practitioners using this type of model may find it useful when working with clients to help them understand the systemic nature of the process and to "justify" the time spent on needs assessment. Often clients are interested in evaluation data, which they often see as after the fact, and they are not aware that the baseline data that will be used for comparisons (ROI calculations, etc.) must be collected before the design and implementation of the intervention. Furthermore, by including measures of customer satisfaction in the integrated process, the partnership between HRD and clients is acknowledged and supported. In these challenging times, with the emphasis on HRD's role in supporting performance improvement in the workplace, this integrated needs assessment-evaluation approach can help improve the collaborative nature of the process, along with efficiency and results.

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# Needs Assessment in Practice

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*Many human resource development (HRD) articles and books emphasize the importance of assessing performance and learning needs before implementing performance solutions. While the theory of needs assessment is well charted, its utility remains substantially unexplored. This multiple-case study showed that HRD professionals initiate needs assessment in varied situations and for multiple purposes and that they achieve diverse results.*

Imagine that you purchased a new software product that was accompanied by comprehensive reference guides. The guides promise "easy-to-use" materials that will bring you up to date on current innovations and will let you maximize the software's capabilities. By studying the guides, you can learn about all of the software's features, the logic inherent in their design, the context for using each feature most effectively, and the details on how to enact precise solutions to specific problems. In such a situation, do you imagine that you and other users will immerse yourselves in the reference guides before using the software? Or, will you apply the product's features at random, guided by intuition, informed guesses, and the "advice" of co-workers?

Similar questions should be asked about needs assessment models. Human resource development (HRD) articles and books emphasize the importance of assessing needs before implementing solutions. Further, many comprehensive guides and models purport to be easy to use, provide information about the logic inherent in organization systems, and detail how to enact solutions to specific organizational problems. In general, their authors claim that systematically learning and applying a specific model or approach will result in improved organizational and individual performance.

In addition, self-reported success stories from authors of the models abound. However, rigorous study that describes actual assessment practices in the workplace has been limited (Ng, 1988; Lewis and Bjorkquist, 1992; Tannenbaum and Yukl, 1992). Tesolowski, Newton, and Cureton (1988) contended that needs assessment remains in the "twilight zone" of management because it is not understood. This contention was supported by suggestions that the HRD literature lacks discourse based on expert practice (Lewis and Bjorkquist, 1992). Lewis and Bjorkquist indicated that little is known about the actual approaches taken by expert HRD practitioners to solve performance-related problems, including the methods they use, the shortcuts they take, or the questions they ask. This paper bridges needs assessment theory and practice by describing the process and the results of needs assessment within the context of contemporary HRD practices. The goal of the study was to describe practitioners' frames of reference and needs assessment practices as they *are*, not as they *should* or *might* be.

## Research Methodology

To accomplish the study's goal, the multiple-case study methodology as described by Yin (1989) was used. This method is characterized by three descriptive phases: design, single-case data collection and analysis, and cross-case analysis.

***Design.*** The initial phase of the research process involved three primary tasks: developing the theory, selecting the cases, and designing the data collection protocol. The following sections describe each task.

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*Developing the theory.* Theory development began with a review of the HRD literature, including needs assessment definitions, theoretical underpinnings, and models. Commonly used terms such as need, needs assessment, needs analysis, and performance analysis do not have common meanings among performance technologists and HRD professionals (Sleezer, 1992). Although the terminology varied, four key points of agreement were apparent. *First*, the process of determining needs connects the process of performance interventions to an organization's performance problems or opportunities (Mitchell and Hyde, 1979; Swanson and Gradous, 1986; Robinson and Robinson, 1989). *Second*, the process is one of investigation, problem solving, and decision making (Moore and Dutton, 1978; Zemke, Standke, and Jones, 1981; Georgenson and Del Gaizo, 1984). *Third*, the process precedes the implementation of a solution (Watson, 1979; Zemke, Standke, and Jones, 1981; Rossett, 1987). *Fourth*, the process distinguishes performance problems that should be addressed by training from those requiring other approaches (Nadler, 1982; Laird, 1985).

The HRD literature also contains many models for analyzing performance and training needs. Each model, through a step-by-step approach, operationalizes one or more strategies for identifying individual or organizational needs.

Needs assessment models have different starting and ending points (Sleezer, 1992). For example, some models assume application of the analytical process before a specific performance or training need is identified (e.g., Moore and Dutton, 1978; Wexley and Latham, 1981; Zemke and Kramlinger, 1982; Goldstein, 1986; Smith, DeLahaye, and Gates, 1986; and Cascio, 1987). Other models assume application of the analytical process after a specific need or problem has been identified. Examples include Rossett's (1987) Training Needs Assessment Model, Mager and Pipe's (1984) model for analyzing performance problems, and Watson's (1979) conceptual framework. Both the Dodge (1987) and Goldstein (1986) models concluded the needs assessment process with developing course objectives. Rummler's (1981) principles of performance analysis ended with the actions taken to correct the problem. A number of models extended the process beyond identifying and implementing a solution to reporting actual intervention results (Zemke and Kramlinger, 1982; Rossett, 1987; Robinson and Robinson, 1989).

The literature explicitly detailed few perceptions about the *results* to be achieved by implementing a needs assessment or about how those results should be evaluated. However, one key output of the process appeared to be information. Lampe (1986) identified 16 areas of useful information obtainable through the assessment process. Some approaches and models used, in subsequent phases or steps, the information obtained during the process of determining needs to design instruction or to manage human performance. Hansen's (1989) model, for example, resulted in the identification of solution components and parameters useful in developing the performance improvement program. According to Georgenson and Del Gaizo (1984), other results of the needs assessment process included identification of priorities to help solve an organization's most critical business issues and the participation of management in the needs assessment process.

Following the literature review, theory development continued with the identification of the study's propositions and questions. Propositions helped to limit the study, focus the attention of the researchers, and pinpoint possible sources of evidence. They were as follows: HRD practitioners use needs assessment as a key tool for gathering information and for making decisions concerning problems that require different kinds of solutions; HRD practitioners use needs assessment to identify and/or connect needs assessment to performance problems; and HRD practitioners understand and apply needs assessment theory and models. This study pursued four research questions: (1) What was the experience of the HRD professional who performed the needs analysis? (2) What was the background of the situations in which needs assessments were initiated? (3) What process was used to conduct needs assessment? and (4) What were the results of needs assessment?

*Selecting the cases.* The second task in the study's design phase involved defining the logic behind participant selection and specifying the selection criteria. For this study, each case focused on one needs assessment -- as defined by the practitioner -- that had been conducted within the past year. Prospective study participants were identified from the 1995 list of Oklahoma members of the American Society for Training and Development (ASTD). The criteria for participating in the study were that the individual: had to be employed in a business organization in a manufacturing or service industry; had an internal HRD focus; had conducted a needs assessment within the last year; had to be currently employed

by the organization in which the needs assessment was conducted; and had to be able to participate in the research process. Potential participants were both recruited and screened using telephone interviews conducted by graduate students enrolled in a needs assessment class. The final study participants comprised ten practitioners whose organizational roles included vice president of HRD, HRD manager, training manager, training instructor, and manufacturing services manager. Participants represented a major manufacturer of marine engines; a pipeline company; the United States Postal Service; a gas and electric company; three banks; a regional medical center; a manufacturing company; and a major metropolitan daily newspaper.

*Designing the data collection protocol.* The final task in the study's design phase involved identifying the data sources, designing the case study protocol, and developing a data collection instrument. According to Patton (1980), sources of qualitative data can include documents, archival records, interviews, direct observation, participant observation, and physical artifacts. This study used interviews, observations, and written documents.

The case study protocol contained the following four categories (Yin, 1989): overview of the case study project (project objectives and auspices, case study issues, and relevant readings); field procedures (including credentials and access to study sites, general sources of information, and procedural reminders); case study questions (specific questions to keep in mind when collecting data, table shells, and potential sources of information for question answers); and guidelines for the case study report (outline, format, documentation specifications). The case study protocol included a 30-item interview guide to use during semi-structured on-site interviews. The interview guide requested information in four areas: experience of the HRD professional performing the needs analysis (three items); the background for the needs assessment (five items); the needs assessment processes (13 items); and the needs assessment results (nine items). In addition to requesting information, the guide was structured to help the study participants frame, define, and describe needs assessments from their own unique perspectives.

***Single-Case Data Collection and Analysis.*** The second phase in this research methodology involved conducting the individual case studies and preparing the individual case reports. Preparing for data collection involved forming and training data collection teams. Data collection teams were comprised of students enrolled in a graduate-level needs assessment program. Team training had the following goals: (1) to develop case study investigator skills; (2) to develop the requisite knowledge for competent data collection; (3) to realize general expectations for team performance; (4) to develop team competence in specific data collection procedures (such as the semi-structured interview); and (5) to maintain the confidentiality of the data collected. Preparation for data collection also included students' active participation in developing the case study protocol. Prior to conducting the individual case studies, a pilot case study was conducted. Results indicated the need to reword some of the items on the interview guide to improve clarity.

Each data collection team selected two cases and used the interview guide to conduct a semi-structured interview with the needs assessment practitioner for the case. As soon as possible after the interview, each team completed the second phase by writing an individual case report from the raw case data (including the team's notes and other written information). Each case report included descriptions of the setting, the people, and the activities; responses to the semi-structured interview guide; direct or paraphrased quotations; and the observers' comments.

***Cross-Case Analysis.*** The study's final phase involved drawing cross-case conclusions, modifying theory, developing policy implications, and preparing the cross-case report. A separate cross-case report team initiated this final phase. The team analyzed the individual case reports and case files and studied related documents. Triangulation and peer examination were employed to increase research validity. Triangulation involved using multiple investigators, sources, and methods to confirm the findings and analyses. Peer examination involved data review by investigators unfamiliar with the case and by the teams that had collected the data. Specific tactics identified by Yin (1989) were also used to increase construct validity. These tactics included using multiple sources of evidence, establishing a chain of evidence, and having key informants review the draft case study report. In addition, development of the case study protocol and a multiple-case database increased the study's reliability by documenting its procedures.

**Results**

The study yielded ten in-depth descriptions of HRD practitioners' perceptions about needs assessment processes and results. (Space limitations necessitated a focus on the cross-case results.) The following sections present: information gathered in response to interview guide items for the four research questions pursued, cross-case results, and conclusions.

***Practitioners' Experience Level.*** While the most common HRD role of participants was "manager," practitioners represented a variety of roles. Half of the HRD professionals who participated in the study were training managers. Two were HRD managers, two were organization vice presidents, and one was a manufacturing service manager. Most participants (all but one) had received some level of HRD training. Four had completed undergraduate courses in HRD (two of whom held bachelor's degrees in the field), four had taken HRD courses or workshops, and one had completed a graduate-level course.

***Background of Assessment Situations.*** Needs assessments were implemented in response to a number of situations, had a variety of foci, and were expected to accomplish multiple purposes. Practitioners' descriptions of *the problem or opportunity* that initiated the needs assessment can be grouped into six categories (followed by number of responses in parentheses): to begin addressing a specific performance problem (3); to respond to a problem brought forward by someone else (2); to be a part of an organizational culture change effort (2); to add new life to training programs (1); to be a part of a yearly budgeting process (1); and as the initial effort of a new trainer (1). Participant comments included the following:

> "Needs assessment is required by the company once a year, to assess the training needs of the customer service department."
> "The training council discussed discrepancies, providing the opportunity to design training to address the discrepancies."

When asked to select from among four *purposes* for conducting the needs assessment, practitioners responded as follows (with frequency in parentheses): clarify needs (2), identify needs (2), determine needs (1), formulate needs (2), and multiple reasons (3). Participant comments included the following:

> "Previous training had been a 'shotgun' approach.' The need now was to use a 'rifle approach' to determine specifics."
> "It is important to have meetings, get people involved, and listen to specific needs. This process fosters a good feeling of involvement. It shows we are trying to develop a program by considering their concerns."
> "Needs must be formulated. Because we are a large corporation, we must ensure that employees have opportunities not just in their own area, but in others as well."

In terms of the *focus* of the needs assessment, the majority of the participants (six) indicated multiple foci: performance improvement solutions integrated with organizational development and/or career development. Of those who indicated a single focus, two named "training" while one named "organization change." In terms of *expected accomplishments*, only one indicated a single objective: to identify learning objectives. The remaining responses were as follows (with frequency in parentheses): get everyone involved (6), learn more about the situation (5), understand performance needs (5), achieve an end goal (4), and move from the current situation (3). Participant comments included the following:

> "The needs assessment was not initiated because of a particular problem, but was implemented to get everyone involved, identify learning objectives, and to understand performance needs."
> "We used an eclectic needs assessment, one that addresses all the options listed. The needs assessments of the organization are ongoing."

*Needs Assessment Processes.* Of the 30 items on the interview guide, 13 items addressed needs assessment processes. Responses revealed that: practitioners held diverse perceptions about various aspects of the process; needs assessments frequently combined categories described in the literature; and no assessment focused solely on performance improvement. Practitioner comments about the number of people involved in the needs assessment included the following:

> "Usually, needs assessment is a one-on-one process between the manager and the HRD practitioner. Sometimes our 'floor' employees are involved."
> "Of the 1,600 employees within the organization, 30 liaisons were selected to 'represent the good of the whole' to meet with HRD to brainstorm. The purpose is for the liaisons to contribute and to 'cascade' the information throughout their work areas. This is done to create buy-in."

Practitioner comments about the models, skills, rules-of-thumb, or thinking processes used in assessing needs included the following:

> "No comparison can be made to literature because techniques in books are rarely followed with the possible exception of an organizational development book."
> "Looking at the past is a more realistic approach to determining future needs."

*Results of Needs Assessment.* Participants identified the following actions or interventions that were recommended as the result of a needs assessment: training solution needs were addressed, cooperation was improved, training programs were improved, organization culture was improved, understanding was improved, and experts were identified. Participant comments included the following:

> "Best workers were identified as 'experts' and were named trainers for new workers on the line."
> "Specific training needs and classes based on the recommendations are now in play."
> "Personnel were realigned, so the culture of the organization was changed."
> "An annual calendar for all areas and specific training dates is compiled quarterly."

Post-assessment follow-up included: identification of training solutions to address need; implementation of a training program; establishment of expectations for HRD; discussion of survey results among employees and implementation of changes; and a determination regarding meeting needs. Six participants indicated that employees became more productive after assessment solutions were implemented. Each of these respondents indicated that specific behavioral changes were evident. Eight participants indicated they did not use strategies identified in the literature. Participant comments included the following:

> "The assessment solution was implemented and used to build a training system."
> "The follow-up system will include observation data, periodic departmental checks, job performance information, and a cost-benefit assessment."
> "We need information to identify ways to produce tangible results for financial officers."
> "The company became more effective, positively affecting the 'bottom line.'"
> "We can now provide more detailed, monthly information about costs to senior management and include projections of costs and expenses over 10 years."
> "A career development program was initiated and certification requirements were met."

*Cross-Case Results.* Once synthesized, the results revealed that few practitioners, regardless of their education, knew or used needs assessment models or approaches. However, practitioners identified positive results and actions/interventions from the needs assessment process. The synthesized results did not support the propositions because the needs assessments had served vague goals or broadly defined purposes, few practitioners had linked the goal and the needs assessment, many practitioners had

difficulty defining the financial benefits and the specific accomplishments to be expected, and few practitioners had applied needs assessment theories and models.

***Conclusions.*** This study has important implications for HRD research and practice. Similar to the users of the computer software, the approaches of practitioners seemed to yield some genuine solutions, some new problems, and little improvement in the user's ability to approach future situations methodically and purposefully. The reality is that users rarely study the reference guides and models and few even consult them.

This study was limited because: only 10 cases were studied; comparing the cases on one commonality -- needs assessment -- may obscure issues and complexities within each case; and the researchers were responsible for interpreting the data, and their views may have influenced the results. However, the study's results point to the diversity of needs assessments in today's dynamic business environment. Few practitioners rely on theories and models that appear too complex or abstract. In this situation, practitioners could benefit from additional research and model-building aimed at practical needs assessment tools.

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# An Integrative Job Analysis Model for Human Resources

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*Job analysis serves as a foundational activity for most core processes of human resource management and human resource development. This paper explores one company's efforts to develop an integrated job analysis model which can serve a variety of HR / HRD needs within an organization.*

Job analysis serves as a foundational activity for most core processes of human resource management (HR) and human resource development (HRD). Unfortunately, most of the job analysis efforts within organizations are poorly coordinated and result in overlapping data and inefficient results. What is needed to overcome these problems is an integrated job analysis model which can serve as a solid foundation to the core HR / HRD processes within an organization.

This paper explores one company's effort to develop an integrated job analysis model which is capable of serving multiple HR / HRD processes. First, the company, Piper Jaffray Companies, Inc., is briefly described along with the structure of its HR and HRD functions. Next, some of the literature of job analysis is reviewed. The specific job analysis needs of Piper Jaffray is then explored along with some of the pressures which resulted in the search for an integrative job analysis model. Next, the process which Piper Jaffray undertook to develop the model and a description of the model itself is presented. Last, some of the lessons learned throughout this whole journey are discussed.

## Organizational Background

Piper Jaffray Companies, Inc. (Piper Jaffray), is a medium sized, 3,500 employee firm which offers a variety of investment and financial services through its three wholly owned subsidiaries: Piper Jaffray Inc., Piper Capital Management Inc., and Piper Trust Company. Founded in 1895, Piper Jaffray is based in Minneapolis, Minnesota, and provides general securities brokerage, corporate and public finance, investment management and trust services to individual and institutional investors, corporations and public entities. Piper Jaffray operates 81 branch offices in 17 Midwest, Mountain, Southwest and Pacific Coast states. Total operating revenue for 1995 was $431 million.

The investment services industry, like many service industries, is going through a period of rapid change which is placing pressures on Piper Jaffray. Some of these changes include impending modification of federal regulations which affect the investment and banking industries, the increase of competition from discount brokerages, decreasing profit margins, and changes in the demographics and investment habits of the population.

The HR department at Piper Jaffray has grown as a function of internal requests for services. That is, as various services were requested of HR, processes and systems were put into place to accommodate them. The HRD function within the firm consisted of decentralized islands of training departments which were housed in HR, Information Services, and Sales. This method worked sufficiently for a large portion of the company's history. However, as Piper Jaffray has continued to grow, as its operations and services have become more complex, and as pressures to perform have increased, the company has had to re-examine its ability to provide effective human resource services in an efficient manner.

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Some changes have already been made to improve the structure of HR/ HRD within the firm. All training was centralized under an umbrella department, named Piper Institute. Piper Institute has continued to provide training services throughout the firm, but has also broadened and redefined its mission to performance based HRD. Additionally, Piper Institute and HR undertook a joint project to clearly define the mission and needs of the organization as a whole, audit the existing HR/ HRD functions, and make changes to these departments so that they better aligned with the firm. Changes being contemplated include the departmental structure of HR / HRD, core processes, required skill sets, and metrics for performance. One early result of this investigation was a realization that job analysis must play a more integral role in the future for HR and Piper Institute.

**An Introduction to Job Analysis**

Job analysis has always played an important role in the area of human resource management and human resource development. Even though the concept of job analysis and its associated terminology has been beset with semantic confusion within the literature, a simple definition of job analysis would be "the act of documenting any relevant features of a given job, including features of the job itself, features of the environment in which the job is situated, and features of the persons who hold or might hold the job." What qualifies as "relevant" is dependent upon the ultimate use of the data which emerges from the job analysis.

Job analysis has been described as the "hand maiden" for practically all of human resource management (HRM) broadly construed (Noe, et al., 1994; cf. McLagan, 1989, for a discussion of the distinction between HRD and HRM). Job analysis serves as a foundational activity for compensation, selection and staffing, career development and pathing, performance assessment and review, legal compliance, and other core HR processes. Numerous methods for conducting job analysis appear in the literature such as the Position Analysis Questionnaire (McCormick & Jeaneret, 1988), Functional Job Analysis (Fine, 1988), Job Element Analysis (Primoff & Eyde, 1988), Critical Incident Technique (Flanagan, 1954), Competencies (Spencer & Spencer, 1993), task analysis, and others (Gael, 1988;

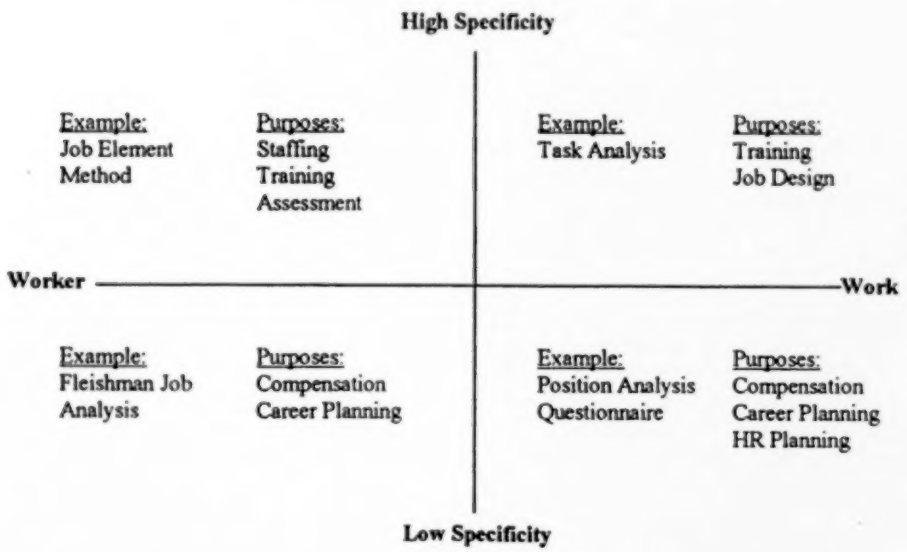


Figure 1. - Job Analysis Classification: Adapted from Noe et al., Human Resource Management, 1994

Harvey, 1991; McCormick, 1976). Each have been developed with a particular purpose in mind, and research has suggested that each method is best suited to provide data for one or a small subset of core HR / HRD processes (Levine, et al., 1988).

Job analysis techniques can be divided along a number of dimensions. Perhaps the most useful classification scheme was provided by Noe et al. (1994). Noe classifies job analysis according to two dimensions: from high specificity (position specific) to general, and from worker oriented to work oriented (see figure 1). This results in a four quadrant classification scheme: high specificity work oriented, high specificity worker oriented, low specificity work oriented, and low specificity worker oriented. The use of the job analysis data typically determines what type of job analysis is required. For example, the compensation function typically requires general, worker specific information. Training, on the other hand, typically requires fairly specific, work related information. It is important to note that this classification is a rough approximation of the reality of both individual job analysis techniques and the purposes of those techniques.

Another useful classification scheme was offered by Harvey (1991). In this model, job analysis techniques are divided again along two dimensions. The first dimension is the same as the Noe et al. (1994) model: specificity of information. Harvey divides this dimension into high, medium, and low. The second dimension, however, is concerned with the scale metric of the job analysis method. There are three different metrics according to Harvey. The first is cross-job relative rating scales which permit one to make meaningful comparisons across different jobs. Scales which use behaviorally anchored rating scales (BARS) typically fall into this category because a task or trait is rated relative to some specified metric, not just relative to other tasks or traits of the same job. The second category is within job relative rating scales. These types of scales allow one to make inferences only relative to other tasks in a given job. For example, relative importance scales are of this type because relative importance is only meaningful within a specific job. A secretary and a diplomat might rate negotiation skills as highly important to their jobs, but we would not conclude that these ratings mean the same thing in these two very different occupations. The last rating scale is qualitative, in which no numerical comparisons can be made either within or across jobs.

Job analysis must be carried out to effectively and legally perform numerous HR / HRD functions. One could develop training programs, staffing guidelines, or performance reviews without a thorough analysis of what knowledge, skills and abilities workers must possess to be competent, but the quality of those programs would be seriously undermined. Furthermore, it would be a practitioner's nightmare to be confronted with the prospect of having to conduct multiple job analyses for all of the different processes for which they are used in HRD and HRM. Unfortunately, the literature generally recommends different techniques for each different purpose (e.g., Noe, et al., 1994, Harvey, 1991), which is an unsatisfactory solution to a perplexing problem.

**Job Analysis at Piper Jaffray - A Statement of the Problem**

One thing which became clear during the initial phases of the audit of HR / HRD was that there were some serious issues with the way that job analysis was being conducted throughout the firm. Multiple methods were being used for multiple purposes. These methods were oftentimes overlapping, collecting similar data in some cases, and completely different data in others. The multiple methods were cumbersome not only for the HR personnel and line managers conducting the job analyses, but also for the employees who were the focus of the data collection. For many HR / HRD processes, no job analysis methodology was being employed at all. The situation as it currently exists is depicted in figure 2.

This only depicts the current situation. Another factor which is impacting job analysis methods at Piper Jaffray has to do with the type of services being requested from HR and Piper Institute. As human resource issues continue to become more important throughout the firm, more sophisticated services are being sought. For example, Information Services has recently requested a system which will allow them to develop job structures, career pathing and individual development plans for their employees who work in an environment of fast changing skill sets and requirements. Operations has recently requested a method to define the jobs of supervisors, assess current supervisors based on those definitions, develop an equitable compensation structure, develop career paths, and provide for training and

development plans. Each of these requests have some important characteristics in common. They are very sophisticated, they seek to develop a comprehensive approach for dealing with human resources, and they rely heavily on an up front investment in job analysis.

| Job Analysis Method | HR / HRD Process Served |
|---|---|
| Compensable point-factor survey | Non-exempt compensation |
| KSA analysis derived by supervisor | Interview guidelines |
| KSA analysis derived by employee<br>Goals and objectives | Performance review<br>Performance management<br>Development planning |
| Task analysis<br>KSA analysis | Job definition and job description |

Figure 2. - Job analysis methods currently being used at Piper Jaffray Companies, Inc.

The combination of the inadequacies of the current system and the nature of customer requests has caused HR and Piper Institute to rethink the role of job analysis within the firm. First, it was decided that job analysis must continue to play a role as the foundation of core HR / HRD processes. This is true not only from a quality perspective, but from a legal perspective as well. Second, and more profoundly, it was decided that Piper Jaffray needed an integrated job analysis model which would allow us to collect the data needed for the core HR / HRD processes in one sitting. Conceptually, the type of model which was needed is pictured in figure 3. At the center of this model is the job analysis, which serves as the foundation for all the outputs of the core processes.

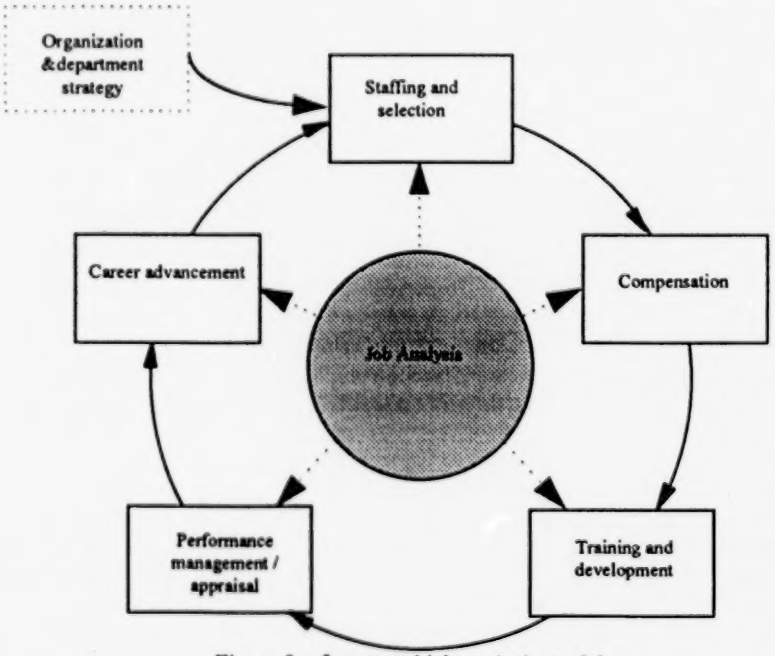


Figure 3. - Integrated job analysis model

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**Researching and Developing an Integrated Job Analysis Model - A Case Study**

Piper Institute and HR joined together to embark on a project which was designed to come up with a job analysis data model, a process for collecting the job analysis data, and processes for converting that data into the necessary HR / HRD outputs such as staffing guidelines, compensation structures and individual development plans. In order to specify what such a job analysis model would look like, process owners of the core HR / HRD processes were interviewed to determine information requirements. Next, we looked to three primary sources for additional guidance in the process. First, the academic and practitioner literature on job analysis was reviewed. Second, benchmarking reports of how other companies have tackled similar problems were examined. Last of all, several consulting firms with expertise in developing integrated job analysis systems were brought in.

By far, the most useful sources of information for this project were the benchmarking reports and the consulting firms. Job analysis models found in the academic literature were for the most part much too complex and cumbersome to be of much use in an organization which has a culture of practicality and simplicity. Additionally, the models most popular in this literature are not ideally suited for the purposes of integration. Rather, they are each designed for a particular purpose such as staffing or compensation. The literature which did mention integrated approaches, such as that on competencies (Spencer & Spencer, 1995) was found to be lacking on specifics of implementation. The benchmarking data, on the other hand, was useful in that it made clear that many other companies are struggling with this very issue. Most firms which we found who were actively working on this type of project were developing custom models and processes which were specifically designed to address their own particular needs. These models ranged from the complex, to the extraordinarily simple. The most useful source of information by far, however, was the various consulting firms who have been working on this issue for some time. Not only have these firms developed job analysis models capable of integrating core HR / HRD processes, they have also come a long way in providing information systems which are capable of handling the data management task. This type of information system is crucial in most cases to make such a project manageable.

The project team settled on a job analysis model which focused on two primary types of information: work specific task information and worker specific competencies. A balance was sought between the dimensions present on figure 1. These two types of information are linked to each other to provide an integrated model. The combination of this information makes up what is called the "job map."

**Developing the Job Map**

The following steps describe how the job map is created.

1. Derive job specific task clusters - This data can be collected in a number of ways, including process mapping, pre-defined task inventory check lists, surveys, focus groups, or any other of the well known methodologies which produce a list of task clusters describing the major work functions of a given job.

2. Derive ratings of task clusters - The ratings include relative time spent on a task cluster, relative importance of a task cluster, and whether an employee can be trained on that task cluster, or should be selected based on whether they can already perform that task cluster (train versus select).

3. Develop worker specific knowledge, skills, and characteristics (KSCs) *which are required for performing each task cluster* - That is, the KSCs are developed by asking SMEs about their applicability to the task or task cluster under consideration. For example, we would take Task Cluster #1 from step 1 and then develop KSCs which are required for that task cluster. This information, too, can be collected in a number of ways, including focus groups, surveys, or interviews. Knowledge, skills, and characteristics are defined as follows:

Knowledge - What must someone know to be able to perform the task? What data or information must be available in ones "mental bookshelf?" Key question: This person must have knowledge of _____.

Examples: Knowledge of Microsoft Word
Knowledge of EEOC guidelines
Knowledge of mutual funds

Skills - What must one be able to do physically or mentally to be able to perform the task? What behavior is necessary? Key question: This person must be able to _____.

Examples: Be able to fill out an order ticket
Be able to effectively run a meeting
Be able to calculate the slope of a bond yield curve

Characteristics - What general personal characteristics must one possess to be successful at the task? What should a person who does this task be like? Key question: This person must be _____.

Examples: Details oriented
Motivational
Achievement oriented

4. Derive ratings of KSCs - Rank each KSC in terms of relative importance, train or select, and essential or differentiates *as it relates to the task cluster*. An essential KSC is one which a person must have to be able to perform the task, but will not result in exceptional performance. A differentiating KSC is one which is also essential, but also results in exceptional performance if present. For example, "knowledge of mathematics" is an essential KSC for the task cluster "Conduct client investment presentations which result in new accounts", but "being able to build relationships" is a differentiating KSC.

5. Cluster KSCs - Cluster KSCs from all task clusters into common items to derive one set of KSCs from the multiple sets developed from multiple task clusters. For example "knowledge of mathematics" is a KSC which would come up twice in step 3. It is required for the task cluster "Calculate rates of return for various investment instruments" and the task cluster "Develop reports demonstrating the performance of client accounts." During this step, these duplicate KSCs would be clustered into one unique list.

6. Further cluster KSCs into major types - For example, industry specific, interpersonal, technical, supervisory, etc.

7. Develop the "job map":
- List tasks across the top in some order (process steps, contiguity, dependency, ease or other).
- List KSCs down the side.
- If the KSC is essential for a task, then place an E in the intersection. If it is distinguishing, place a D in the intersection.
- Remove any KSCs which are not essential or distinguishing for any task.

| | Task Cluster #1 - T | Task Cluster #2 - T | Task Cluster #3 - S | Task Cluster #4 - T |
|---|---|---|---|---|
| KSC #1 - T | E | D | | |
| KSC #2 - S | | E | | |
| KSC #3 - S | | | | D |
| KSC #4 - T | E | E | D | |

Figure 4 - Partial Job Map: T=trainable; S=select; E=essential; D=differentiates

**Using the Job Map to Integrate Core HR / HRD Processes**

After this information has been collected, subsets of the job analysis data will be used for the following activities:

Staffing and selection:
All KSCs labeled S (select) will be used to create staffing guidelines and structured interview and selection plans.

Compensation:
Certain KSCs and task clusters as determined by the relative importance and relative time spent scales will be extracted and used as the basis for a point-factor system to develop the compensation structure.

Training and development:
Task clusters and KSCs which are trainable and labeled E will be used for orientation or beginning level training curriculum.
Task clusters and KSCs which are trainable and labeled D will be used for advanced training curriculum.

Performance appraisal:
A combination of task clusters and KSCs based on relative importance ratings and relative time spent will be extracted and used for performance appraisal and development plans.

Career pathing:
Job maps for different jobs will be analyzed to create development plans which map into career paths.

**Some Lessons Learned - Results and Conclusions**

The most difficult part of this entire project has not been the definition or creation of the job analysis model. Most of the approaches for integrated job analysis models which are offered by various consulting firms or discussed in the literature are more similar than different. The types of data and the data collection methods are well known. It really is just a matter of putting things together in the right way.

What is difficult, however, is the implementation of such a model. Education plays a key role in the initial project stages. Most senior managers and line managers do not really understand what the point of job analysis is and how it is essential for effective and efficient HR / HRD processes. The focus from managers is primarily on outputs of the process, such as individual development plans, staffing guidelines and compensation structures. Consequently, selling senior level managers on integrated job analysis is a burdensome and potentially counter-productive task. A much more fruitful approach is to sell the organization on the outputs which are provided from such a model. Convincing senior managers that they can benefit from quality career pathing and staffing guidelines is much easier then convincing them that an integrated job analysis model is useful. Once you have the buy in on the outputs of the process, then the integrated job analysis model simply becomes one hidden step to achieving them.

Another thing learned which is related to the above is that a pull strategy is much better than a push strategy in getting such a project off the ground. Instead of trying to push an integrated job analysis model, allow the organization to pull towards such a model. At Piper Jaffray, we were having limited success outside of HR and Piper Institute in convincing senior managers that an integrated job analysis model was a good way to achieve many of their objectives. However, when the CIO came to us demanding that a system be created which would allow him to define operation supervisors jobs, create career paths, create compensation structures, and create development plans, the integrated job analysis component was simply a requirement of the project.

One surprising lesson was that the most cutting edge work on job analysis is being conducted within consulting firms, not in academia. The models and ideas we encountered in our discussions with the major consulting companies were far ahead of anything we had uncovered in the literature.

Additionally, many of the job analysis models were accompanied by information systems which were designed to automate the data collection process and to allow automatic generation of core outputs such as interview guidelines or individual development plans. The interaction with consulting firms was by far the most valuable part of the whole process.

An integrated job analysis model can serve as the foundation for core HR / HRD processes within any organization. The details of such a model will be different dependent upon what the specific needs of an organization turn out to be. Some organizations might not even benefit from such a model because of industry, complexity, or culture. However, the potential power of such a model is reason enough to explore the possibilities in most firms. The paper has described the experiences of one such firm who has taken the first steps to making this powerful idea a reality.

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